OULU UNIVERSITY OF APPLIED SCIENCES

Ibrahim Adesanya Alli

DEVELOPMENT OF AN E-SERVICE APP ON THE ANDROID PLATFORM (BACK-END)

DEVELOPMENT OF AN E-SERVICE APP ON THE ANDROID PLATFORM (BACK-END)

Ibrahim Adesanya Alli
Bachelor's Thesis
Autumn 2016
Information Technology
Oulu University of Applied Sciences

ABSTRACT

Oulu University of Applied Sciences
Degree Programme in Information Technology

Author(s): Ibrahim Adesanya Alli
Title of the bachelor's thesis: Development of an E-service App on the Android Platform (Back-end)
Supervisor: Väisänen Veijo
Term and year of completion: Autumn 2016 Number of pages: 26

The aim of this Bachelor's thesis was to make it as easy as possible for parents and guardians to get the services of childminders or nannies for their children. The aim was to reduce the problems of time and availability when seeking the service of a nanny.

The idea of this thesis was formed by me and my thesis project partner due to our personal experiences in Nigeria. As graduating students in the field of information Technology, we saw the need to solve this problem with our acquired skills.

The BabyShift application was developed on the Android Studio version 2.2.0.12 with Android API 21 using Java programming language and SQLite for the database. The application was created with two different user interfaces, one for parents and the other for nannies. Nannies will be able to register, sign-in and make business profiles regarding their services and also parents will be able to register, sign-in and search for a suitable nanny who meets their requirements using a location and a username as search criteria.

The market strategy was based on the Nigerian market and it was carried out in our previous study at Oulu University of Applied Sciences.

Finally, the development of the BabyShift application came to realisation, the application ran successfully on all Android mobile phones. However, the payment module for the application will be incorporated as the BabyShift application is open for further development.

Keywords: Android, Java Programming Language, SQLite

PREFACE

This thesis project idea was conceived after brainstorming alongside with my thesis project partner. We intended to do a project that will solve a particular problem and also enable us start a business venture.

I would like to thank my supervisor Veijo Väisänen, Who was very supportive throughout the period of this thesis project. I would also like to thank Oluwaseye Omowa, my thesis partner and Kaija Posio, my language teacher for making this write-up a success.

Oulu, 20.8.2016

Ibrahim Adesanya Alli

CONTENTS

TERMS AND ABBREVIATIONS

Android studio	Android's IDE
App	Application
API	Application Programming Interface
GIT	Version Control Software
GUI	Graphical User Interface
OS	Operating System
OAE	Official Android Emulator
PDF	Portable Document Format
UI	User Interface
IDE	Integrated Development Environment
SDK	Software Development kit
VCS	Version Control System
3G	Third Generation of Mobile Telephone Technology
VM	Virtual Machine
JIT	Just-in-time compilation
AOT	Ahead-of-time compilation
DVM	Dalvik Virtual Machine

1 INTRODUCTION

The world economy is growing at a rapid speed nowadays and so does the working class. Every family needs to earn a living to cope with the fast growing economy in order to make ends meet. It becomes difficult for parents to work, especially if they have children who need a full-time care. Parents are unable to focus on their careers or jobs because they have a responsibility for taking care of their children. With this gap between the need to work and responsibilities towards the children, some families suffer from financial crises or one of the parent loses his/her career. Most of the times women give up working. With this increasing requirement, especially from the working class, there is an essential need for a service, which parents can use to solve this problem of taking care of their children.

In this study I have suggested a simple application to cater for the needs of parents having children. Parents search around their neighbourhood or environments for nannies to take care of their children or they just give up their jobs. If they do physical search for nannies, it becomes exhausting and most of the time parents fail to find a good nanny. And sometimes they find it difficult to trust the available nannies.

To address the above mentioned need I have developed an application to help parents to find good nannies, whom they can trust and give them the responsibilities for their child. The application, BabyShift is a platform where parents and nannie can register. Parents register to view all the nannies who have made their profile on the app. This lets the parents find the nannies easily. A five star system of rating the nannies has also been induced in the app. This lets parents know the quality of services a nanny provides.

Nannies can register their services by making a profile. This profile includes all the necessary information of nannies and their contact details. Nannies can edit their profiles whenever they want. This two way interactive portal helps both the parents and the nannies. Nannies can present their services on a platform and can get jobs, whereas for parents this app saves parents from the stress of finding nannies.

1.1 Team structure

In this project, the major task I performed was to develop the BabyShift App and carry out the research thesis. Table 1 shows the project team structure.

TABLE 1. Project team structure.

Name	Nationality	Role	Tasks
Ibrahim Adesanya Alli	Nigerian	Developer	Android development
Oluwaseye Omowa	Nigerian	Developer	Thesis writing front-end
Ibrahim Adesanya Alli	Nigerian	Developer	Thesis writing back-end
Ibrahim Adesanya Alli	Nigerian	Developer	Marketing strategy
Oluwaseye Omowa	Nigerian	Developer	UI development for Android
Oluwaseye Omowa		Developer	Testing

2 USED TECHNOLOGIES

2.1 Android studio

For the development of BabyShift app Android Studio was used Android Studio is a development platform for Android which provides an integrated development environment (IDE). It was released on 16th of May 2013 at the conference held at Google I/O. Android Studio is easily obtainable under the Apache License 2.0.

Android Studio is intended explicitly for the Android development. It is accessible for download on Mac OS X, Windows and Linux, and it substitutes Eclipse Android Development Tools (ADT), which was Google's primary IDE for the initial Android application development.

As mentioned above that Android studio is an Integrated Development Environment, therefore, it provides inclusive facilities for software development to computer programmers. An IDE usually consists of a build automation tools source code editor and a debugger. This, Android studio also has an intelligent code completion with a compiler and an interpreter.

With a solo download of Android Studio, the official IDE for Android development, everything that is needed to start developing Android apps is included. [7]

IntelliJ IDE + Android Studio plugin

Android studio with IntelliJ IDE. Was used IntelliJ IDE is an intelligent Java IDE with an enhanced ergonomic design and a code analyser to maximize the productivity. It provides clever and instant code completion suggestions along with reliable tools for code refactoring.

Android SDK Tools

Android Software Development Kit is the basic tool for developing software applications. It includes the required libraries, a debugger, a relevant documentation for Android application program interfaces (APIs), sample source code, and tutorials for the Android OS.

Android Platform-tools

To make BabyShift backward compatible platform tools were integrated. These tools allow the backward compatibility of new versions. These tools are updated for each new release of Android SDK and they act as a bridge which allows to communicate with the emulator or Android device.

A version of the Android platform

A version of an Android platform refers to the release of the Android platform, which is referred to by a code name. Examples of code names are e.g. cupcake, Donut, Éclair, KitKat and Marshmallow. The latest version platform is Nougat.

Android Emulator with an Android system image including Google Play Services

To test the BabyShift app, an emulator was used. The emulator is a virtual mobile device which can be run on a computer to check the working of an APK. The emulator allows you to develop and test Android applications without a physical device.

Google play services allow an application update from Google Play Services. This part component offers an essential functionality, such as verification to your Google services, access to the latest privacy settings, synchronized contacts and advanced location based services.

Figure 1 shows the image of an Android emulator. The BabyShift app was run on the emulator.

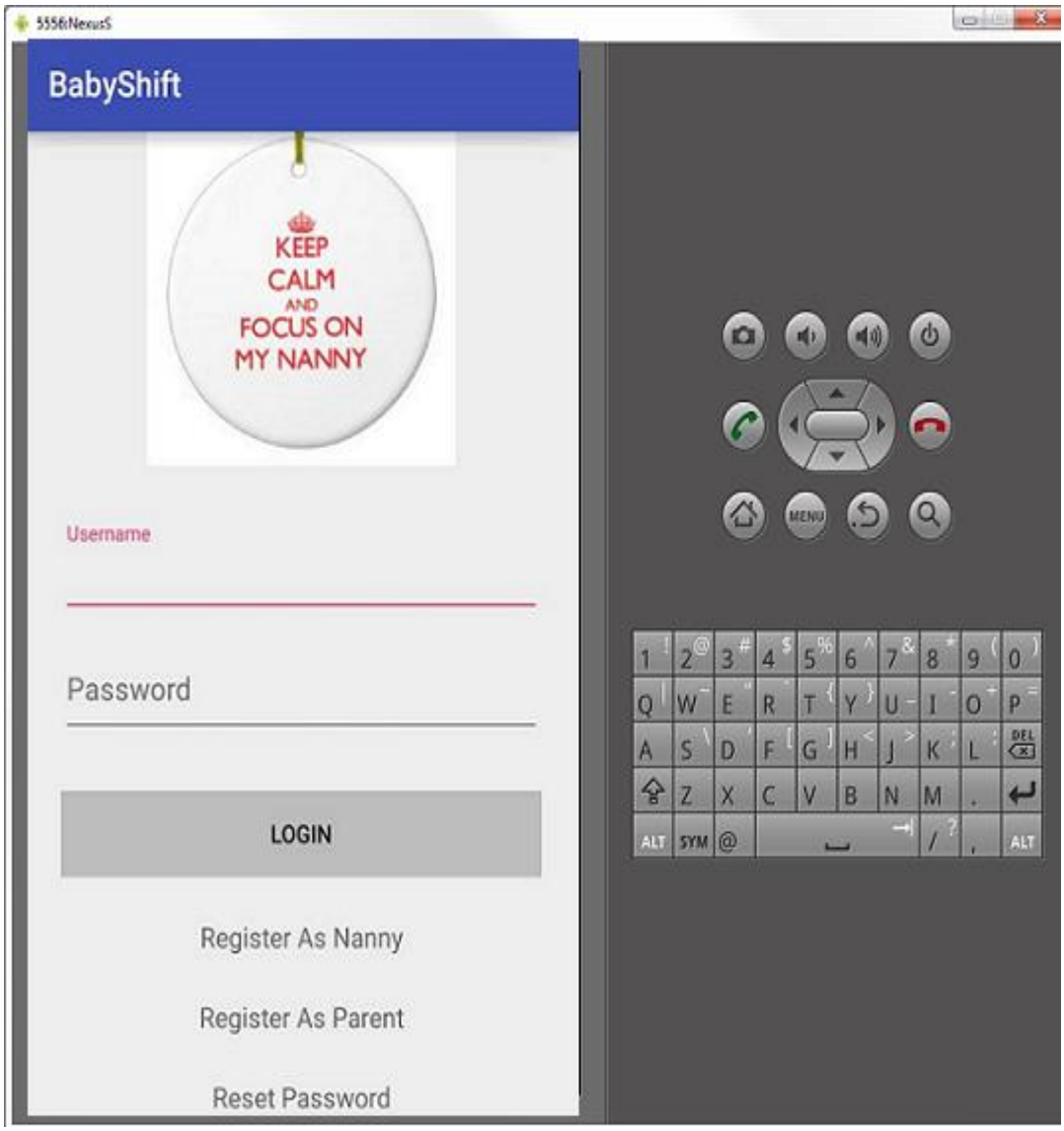

FIGURE 1. BabyShift run on the Android Emulator

Android APK

BabyShift App was further converted into an APK. The complete developed Android application is known as APK, i.e. The Android application package. It is the file format of a package used by the Android Operating system for installation and distribution of Android mobile applications.

To create an APK of BabyShift, a code for Android was compiled first, and then its components were wrapped into one file folder. An APK file comprises all components of

program's code, assets, resources, manifest file and certificates. The APK files are produced with the .apk file extension. Whenever a person downloads and installs an application from Google Play or another source, they are basically downloading and installing an APK package file on a particular device. In short, a completely developed application is in the form of APK. [7]. The latest version of Android was released in 2016 and its version number is Android Studio v2.2.1.

2.2 SQLite

The database used for the BabyShift application is known as SQLite. It is a RDBMS, (Relational Database Management System) which is not like a typical client-server database engine, rather SQLite is embedded into the end program. Thus, basically it is an embedded database system for storing the data locally, i.e. a client/local storage in application software. This database has binding to various language for programming and it is mostly and widely used by embedded systems, i.e. mobile devices.

SQLite does not have client server standalone processes, which are used in client/server DBMS through which the application program communicates. Rather it is linked into the application and it is considered as an important part of the application program. It is a simple database system, which requires less configurations compared to client/Server DBMS.

Android offers many ways to save data, SQLite Database is uniquely included in Android OS. It is simpler to use this database as it saves data locally into a device and it is easier to retrieve data. The design objectives of SQLite aims to let the program to be able to function without installing a DBMS - database management system and without needing a database administrator. Moreover, SQLite is a software that implements a zero-configuration, server less, self-contained and transactional SQL database engine. SQLite is the most extensively installed SQL database engine in the world. SQLite’s source code is open-source, i.e. it is in the public domain. [2]

2.3 Version control

We also used Version Control Technologies while developing the BabyShift App. Nowadays, Version control is an important technology that helps the developers working in a team to control the versions of a program. The Version control system, which is also referred to as a source control or revision control is a system that helps to keep a record or a log file of the versions of a program. It manages the updated changes in all kinds of documents, programs or applications. Every change that is made to a file is known as a version or a revision of a particular file. Every revision has a version number and a timestamp related to it. The timestamp specifies the time and other details like the version number of the updates in a file.

In software design a lot of individuals work together in a solo or compound project. For example, while developing the BabyShift application, there were numerous files associated with that program. Moreover, there were folders and various versions of multiple files. In that case it becomes difficult for a developer to update every single file and distribute it to other team members manually. Here, the version control system plays its part. It allows to maintain a single repository where data can be kept and accessed by all the team members. It saves a lot of energy, effort and time. Furthermore, the work is not lost and even not overridden.

Other benefits of the version control system is that it controls, organizes, tracks, restores over revisions and maintains different versions of a file. For the developers and web designers, it is very sensible to use VCS. Mainly there are two kinds of version control structures. One is a distributed version control and another is a centralized version control.

The major variance between the centralized version control and distributed version control system, as shown in figures 2 and 3, is the quantity of repositories. In the distributed version control, multiple repositories there are, while in the centralized version control, only one repository contains the file. [8]

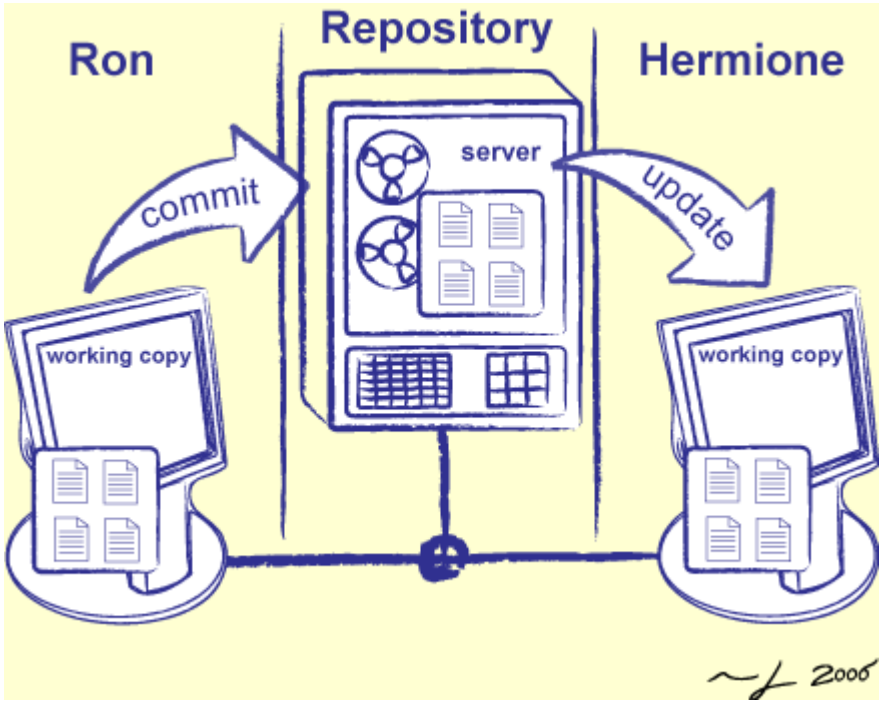

FIGURE 2. Centralized Version Control System. [8]

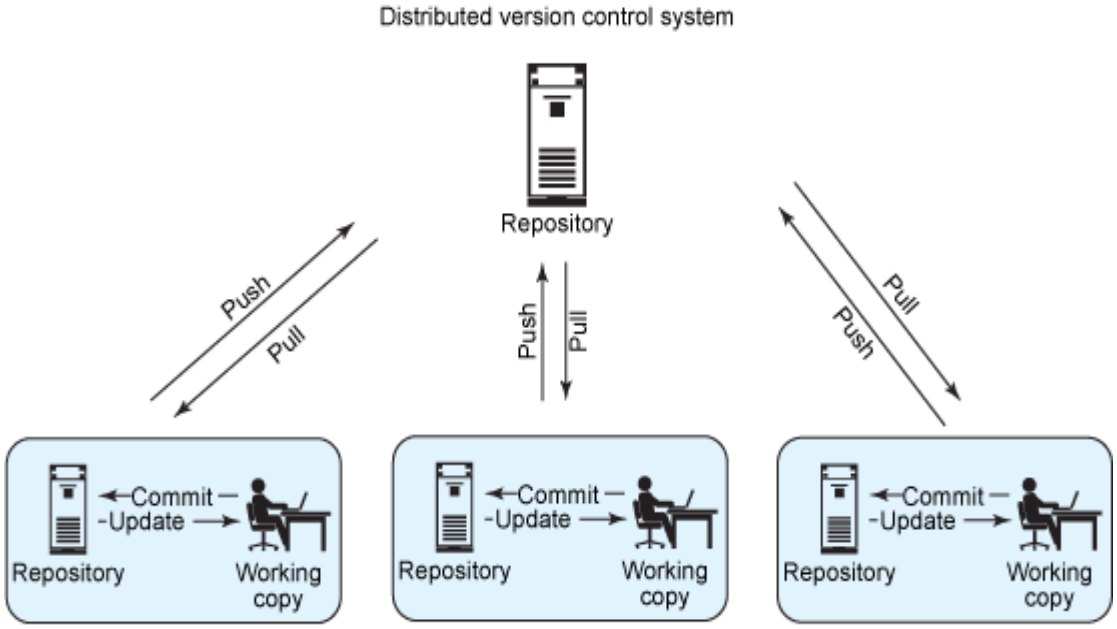

FIGURE 3. Distributed Version Control System. [8]

There are many other version control systems but the GITHUB system, which is supported by Android Studio, was used in this project.

GIT (version control software)

The GIT Version Control Software was analysed for the use of the BabyShift Application. GIT is an open source and free distributed version control system. GIT was originally designed and developed by Linux Kernel developers in 2005. Its basic purpose was to support the development of the Linux Kernel development.

It enables developers to keep track of the alterations made in the development. GIT uses a command line to run on a local machine. GIT's connectivity allows the working of the development team to be smooth in a way that it is a repository of updated or changed resources. Its instructions are easy to use and learn gradually. Unlike other systems, GIT is not file-based; it stores data in a diverse way. Information is stored in the form of snapshots on GIT. If there is a problem with the newest version of the code and a programmer wants to undo the changes and retract to the older version, it has a mechanism to track the history and it is likely to have an older version, thus the use of GIT is easy and essential. [1]

GitHub

Apart from GIT, GITHUB was also analysed for the BabyShift Application. Different from other VCS, GitHub is a hosting service that is web-based. It is very comprehensible and convenient for projects to retain track of the changes. GitHub makes use of the GIT revision control system. GITHUB is developed using Ruby on Rails. It is a teamwork platform, which permits us to host GIT repositories that are remote. GitHub is made on the top layer of GIT and allows to maintain both remote and local copies of the development. Thus, in that way it is much of a cloud-based GIT provision. It is a code distribution and dissemination service for developers and coders so that they can work together on a development project. It saves the main file in a memory called the "Repository" and lets the developers of the project have the ability to transfer the file as a clone and create changes to the clone. [5]

2.3.1 Android studio and GitHub

Upon analysing GITHUB we used for the BabyShift App as it was a web-based VCS supported by Android Studio. Android Studio supports a range of version control systems (VCSS), including CVS, GitHub, GIT, Google Cloud Source Repositories and Mercurial Subversion. GIT makes a worthy use of the native files stored on a computer whereas GITHUB allows to distribute the files on shared repositories. During this project, GITHUB was used as VCS, because it allows an easy sharing with the team member. The following is the method of how to use GITHUB with Android studio. [10]

Importing the BabyShift application

First the BabyShift Application is imported into Android Studio and afterwards the Android Studio version control system menu selections are used to allow the VCS provision for the anticipated version control system, to generate a repository, to import the files into VCS and to make other operations on the version control.

Enabling the Version Control (GIT) integration plugin

To enable the version control integration plugin, the Android Studio Version Control System menu needs to be opened and then enable Version Control Integration must be clicked. After that File →Settings → Search… are clicked one after another.

Version Control Options

The VCS menu now displays a number of version control options based on the system that has been selected.

Add a project file to a local repository

Adding a project file to a local repository is done by right clicking on the project and then clicking GITHUB and add.

Commit added files

Next in the terminal window the Version Control windows must be opened and the commit button must be clicked from the prompt window to select "commit and push".

Defining remote

After analysing the code Android studio will prompt to review or commit the code. When it has been committed, the remote repository will be defined promptly. There the URL can be added to the GITHUB repository.

2.4 Java programming language

The certified language for the Android applications development Java, is used for the BabyShift application. Huge fragments of Android are inscribed in Java and its APIs are intended to be called mainly from Java. It is also possible to develop apps using C and C++ along with Android NDK (Native Development Kit), but this action is not promoted by Google as these languages do not provide the full functionality.

The NDK provides the limited functionality thus, a developer needs to balance its paybacks against its drawbacks. Particularly, using instinctive code on Android usually does not affect an obvious performance enhancement, but every time it increases the complexity of the app.

Java is a programming semantic initially created by Sun Microsystems in 1995. Its functionality can be practiced on various different types of devices from mainframe computers to smartphones. It can be utilized on a desktop PC and on the Raspberry Pi. This language does not rely to a native processor code but moderately it compiles on a “virtual machine”, which comprehends a midway layout called a Java bytecode. Java, which runs on any platform, needs a virtual machine (VM) application.

In the case of Android, the novel VM is called **Dalvik Virtual Machine (DVM)**. Its next generation Virtual Machine, called ART, has also been framed by Google. The work of these virtual machines is to understand the bytecode, which is a set of commands analogous to the machine code found in CPUs, and to implement the software package on the CPU. The VMs use a diversity of technologies comprising of AOT (ahead-of-time compilation) and JIT (just-in-time compilation) to speed up the procedures. [9]

2.4.1 Why use Java?

The Android application development kit is a free and open source operating system basing on Linux, it has its own intermediate system and key applications. The Android application is supported by Java, which means that Android inherits all the flexible and reliable characteristics of Java applications.

In short, Android applications can be developed on any Operating system, such as Linux, Windows or OS X. As the Java compiler adapts the code into the machine readable bytecode and Android applications are developed by using Java therefore the Android application can be built on any OS using VM built-in to Android platforms. This is dissimilar to the model used by iOS that utilizes a native compiler to change Objective-C into the ARM machine code.

Though Google offers the Java API, the Android platform does not utilize JVM to perform class files, but it uses Dalvik Virtual Machine (DVM). The files are compiled using a Dalvik Executable (DEX) format, and packaged as Android Package (APK) beside other resources.

If a developer is aware of object-oriented programming principles in Java, producing applications for Android and android application development will be much easier than for producing them to the IOS development. Therefore, Android was chosen for producing the BabyShift application. [11]

2.4.2 Developing BabyShift using Java for Android

Following the below mentioned step, the BabyShift application was created on Android using Java easily. [3]

1. First, an Android project in Android Studio platform was created and the project options, such as the name of the project, app name, i.e. BabyShift, what Android version the app will run on, package name, class name were specified.

2. The next step was to configure the project and choose a launcher icon. This refers to providing the workspace details and picking the appropriate dimensions of the launcher icon.
3. One of the very important aspects of app development is creating activities. This activity refers to activities a user performs on-screen. After selecting the type of activities, the project was created and opened with pertinent resource files to begin the real Java for the Android coding.

The user experience essentials and the appearance of app was designed and declared using the **activity_main.xml** file in the folder **/res/layout** from the package. In this file, string attributes are modified and views for the application are added. Radio buttons or text fields can also be added based on the design and requirement of the app. The Properties of the element can be selected by right clicking on the element, moreover an element can be modified based on the desired layout. [3]

2.4.3 Implementing logic using Java

After the front-end elements had been finalized, the most significant step was to execute logic for all the activities that were to be performed in the app. The logic required to be implemented in the MainActivity.java file from the folder **src/com.example.tutorial application/.**

The **MainActivity.java** file is the file that essentially gets rehabilitated to the Dalvik compatible format and compiles and runs the application. [3]

2.5 Android manifest

Here is the code of the manifest file of BabyShift App

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.harr.nanny.babyshift">
```

```
    <uses-permission android:name="android.permission.CALL_PHONE" />
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"
/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity
            android:name=".AllNanies"
            android:label="Baby Shift"
            android:theme="@style/AppTheme.NoActionBar" />
        <activity
            android:name=".NannyRegistration"
            android:label="Nanny Registration"
            android:parentActivityName=".LoginActivity"
            android:theme="@style/AppTheme.NoActionBar" />
        <activity
            android:name=".NannyDetail"
            android:label="Nanny Detail"
            android:parentActivityName=".AllNanies"
            android:theme="@style/AppTheme.NoActionBar" />
        <activity android:name=".LoginActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity
            android:name=".ParentRegistration"
            android:label="Parent Registration"
            android:parentActivityName=".LoginActivity"
            android:theme="@style/AppTheme.NoActionBar" />
        <activity
            android:name=".NannyEdit"
            android:label="Edit Nanny Info"
            android:parentActivityName=".nannyProfile"
            android:theme="@style/AppTheme.NoActionBar"></activity>
        <activity
            android:name=".nannyProfile"
            android:label="Nanny Profile"
            android:theme="@style/AppTheme.NoActionBar" />
        <activity android:name=".ResetPassword"></activity>
    </application>

</manifest>
```

Figure 4 below shows the constant variable used to pull information with the helper class (SQLite)

```
*/
public class DatabaseHandler extends SQLiteOpenHelper {

    private static final int DATABASE_VERSION = 1;

    // Database Name
    private static final String DATABASE_NAME = "NannyManager";

    // Contacts table name
    private static final String TABLE_NANNY = "Nanny";
    private static final String TABLE_PARENT="Parent";

    // Contacts Table Columns names
    private static final String NANY_ID = "nannyID";
    private static final String NANNY_NAME = "nannyName";
    private static final String NANNY_ADDRESS = "nannyAddress";
    private static final String NANNY_DESCRIPTION="nannyDescription";
    private static final String NANNY_Rating= "nannyRating";
    private static final String NANNY_RatingCount="ratingCount";
    private static final String NANNY_Phone="nannyPhone";
    private static final String NANNY_Dp= "nannyPicture";
    private static final String NANNY_PWD= "nannyPassword";


    private static final String PARENT_ID= "parentID";
    private static final String PARENT_NAME= "parentName";
    private static final String PARENT_PASSWORD= "parentPassword";
```

FIGURE 4. SQLite helper class details.

3 MARKETING PLAN

A marketing plan should be on the top of every new business owner's to-do list. While a business plan helps to map the direction for a company, a marketing plan helps a company to understand how to get there by detailing important steps on the road to create customer relationships. Below are some plans how to engage the clients of the BabyShift application and how to promote it.

Marketing the mobile app before the launch date: Awareness is the key to every successful business. The name, logo and idea behind this mobile app will be introduced to the public in the following ways:

- Media lunch, e.g. in newspapers
- The website where potential clients can read sneak peeks about what the application is about and in the website visitors can sign-up for the beta with their email.
- Promo video will be on YouTube and on the application website.
- Blogging about the business will also be an effective way to grow the fan base before launching the application.

Social Media Marketing: Various social media platforms can be a very effective and inexpensive means of advertising businesses. An account on major social media platforms, such as Facebook, Twitter, Instagram and Foursquare will be opened and share button for social media accounts will be provided on our website and blog. The use of hashtag tool will be made available on social media platforms to join larger and similar conversations. A periodic and consistent update of the blog and posting to Facebook/Twitter, for example, will be a way to engage social media fans of the application.

Promoting the app with Facebook: This paid feature on Facebook makes it easy to find new customers and engage them. This feature enables us to target adverts to specific customer demographics and track how many times the app has been downloaded. This makes the adverts more relevant for the people who see them, it also brings real results.

Advertising on Instagram: Next to Facebook with 1.4 billion users and 900 million daily visits is Instagram, a community of over 500 million. Stories with pictures, videos or slides

can be shared in Instagram to a huge community of users. Through Instagram, also a mobile app install and engagement can be achieved. [4] [6]

The mobile app as a marketing plan: Mobile app gives businesses an advantage of having their own corner on a customer's device. Because users have to download and install the app, businesses have more control over their presence on a device. For instance, a mobile app can be closed or inactive, but it still works in the background to send geo-targeted push notifications and gather data about customer's preferences and behaviours. Moreover, mobile apps make it easy to deploy loyalty programs and use mobile payments using a single platform. It is also much easier to access the service on the mobile. All it takes is one tap, versus having to open a Web browser and then type in a URL.

Google AdWords Advertising: Google AdWords is Google's online advertising program which allows to reach new customers and grow business. With AdWords, it is chosen where ads appear, also, a budget that pleases developers is set, and the impact of the ad is measured. Google AdWords enables to reach people as they search for words or phrases (which are called keywords) or browse websites with themes related to the business. BabyShift ads are displayed to people who search for the kinds of products and services that the firm offers. Thus, those people are more likely to take action. It is possible to choose where the ad appears, on which specific websites and in which geographical areas. With a cost-per-click (CPC) bidding, the developers are charged only when someone clicks the ad, not when the ad appears. The developers decide how much or little they want to spend monthly. [12]

Liaising with Partners with an existing customer base: A media contact will be searched to promote the business, for example, by arranging interviews on popular talk shows either on radio or TV. Also, it is possible to seek the service of big name bloggers and industry influencers for that initial boom.

3.1 SWOT analysis

Having studied the competition in Nigeria, the strength, weakness, opportunities and threats of this business are as follows:

Strength

One of the most competitive advantage of this business is that this is the only online babysitting company and in addition, there is a mobile application. Currently, most agencies are not online and they offer their service from offices. However, all the services of this business are online based. It is possible to provide specialists that can aid our customers regarding their request and needs related to the babysitter whom they want for their children.

Clients will be able to see the profiles of available babysitters, their rating, experience, recommendations, and location. The prices for obtaining a babysitter is comparatively more cost effective than that of other companies and independent babysitters.

This service is also considered to be fast, reliable and efficient. Clients will not face difficulty in getting a babysitter and service is available 24 hours a day.

Weakness

In Nigeria, online babysitting service is new or not common and it may cause certain setbacks for the company. This is because there is a possibility that clients might not choose to use these services to get a babysitter, rather they can be very conventional and prefer the existing services. For the fact that this type of service is not popular, it is a major weakness for this business.

The owners have no business experience, the company is a start-up company and there is no partnership with any company.

Opportunity

The company could achieve a high rate of success because it is the first of its kind in Nigeria as there are no direct competitors. The type of business is somehow already existing, the

owners only want to explore the grey areas and use it as their business model. The illegality in using foreign maid services will also serve as an advantage.

Threats

The company is facing a major competition from foreign maid services. In Nigeria the foreign maid service is highly in demand and therefore our company will face competition from these agencies because most parents may choose to patronise a cheap foreign maid rather than hiring babysitters or nannies.

Another threat that the company will probably face is an economy crisis whereby people might choose relatives to take care of their children instead of hiring babysitters.

4 REFERENCES

1. About Git. 2016. Git. Date of retrieval 7.10.2016
   https://git-scm.com/
2. About SQLite. 2014. Date of retrieval 6.10.2016
   https://www.sqlite.org/quickstart.html
3. Developing an app using java. 2016. Date of retrieval 9.10.2016
   https://developer.android.com/training/index.html
4. Facebook Adverts. 2016. Facebook Business. Date of retrieval 04.10.2016
   https://www.facebook.com/business/products/ads
5. How people build software. 2016. GitHub. Date of retrieval 7.10.2016
   https://github.com/
6. Advertising on Instagram. 2016. Instagram Business. Date of retrieval 04.10.2016
   https://business.instagram.com/advertising/
7. Meet Android Studio. Date of retrieval 03.10.2016
   https://developer.android.com/studio/intro/index.html
8. Ernest Michael. 2012. Version Control. Date of retrieval 05.10.2016
   https://homes.cs.washington.edu/~mernst/advice/version-control.html
9. Programming language for Android. 2016. Date of retrieval 08.10.2016
   http://www.androidauthority.com/apps/
10. Stack overflow. 2015. How to use GitHub with android. Date of retrieval 08.10.2016
    http://stackoverflow.com/questions/16644946/how-do-you-synchronise-projects-to-github-with-android-studio
11. Why Android use Java. 2010. Date of retrieval 09.10.2016
    https://developer.android.com/training/index.html
12. Google AdWords. Date of retrieval 04.10.2016
13. https://adwords.google.com/home/